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UNITED STATES DEPARTMENT OF THE INTERIOR
(BUREAU OF MINES)

SUMMARY REPORT

MINERAL INVESTIGATION OF THE ITALIAN PEAK RARE II AREA (NO. I-1945), BEAVERHEAD COUNTY, MONTANA, AND ITALIAN PEAK MIDDLE RARE II AREA (NO. M-4945), CLARK AND LEMHI COUNTIES, IDAHO

By
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MLA 53-83

1983

This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines standards and nomenclature. Work on this study was conducted by personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, Washington 99202

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FOREWORD

The U.S. Bureau of Mines and U.S. Geological Survey jointly conduct mineral surveys of lands which in the U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S. Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System.

This report concerns the Italian Peak RARE II area (No. I-1945), Montana and the Italian Peak Middle RARE II area (No. M-4945), Idaho.

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SUMMARY

There are no identified mineral resources in the Italian Peak RARE II areas, and there are no producing or developing mines within or adjacent to the study area. Several prospects are in RARE II area M-4945, Idaho, but none were found in the area I-1945, Montana. The Viola Mine (fig. 1, no. 15) vicinity and the Heart Mountain vicinity along the west and south borders, respectively, are being prospected. There has been no recorded production from mines within the study area, but between $2.5 million and $5.0 million worth of lead, silver, and zinc were produced in the adjacent Birch Creek district - dominantly from the Viola Mine - from 1882 to 1889 (Anderson and Wagner, 1944, p. 14). The Viola and other mines in that district are possibly on basin-margin, carbonate-hosted, lead-silver-zinc deposits stratabound within the Devonian Jefferson Formation. Previous studies have considered them to be hydrothermal, replacement orebodies. Mineral occurrences in the Heart Mountain area are possibly black-shale hosted uranium-vanadium deposits in the Mississippian-Devonian McGowan Creek Formation or perhaps the underlying Devonian Three Forks Formation. The Jefferson and McGowan Creek Formations underlie many scattered segments of the study area.

The deposits and occurrences are not sufficiently exposed to determine tonnage and grade, but sampling indicated moderate resource potential at two properties just outside the study area, the Viola Mine and the Elkhorn Group (fig. 1, no. 33). Local residents indicated there are several thousand tons of zinc-bearing resources at the Viola Mine. A 23-ft (7.0-m) drill hole intercept near Heart Mountain at the Elkhorn Group adjacent to the study area contained 0.15 percent uranium oxide (U_3O_8).

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EXPLANATION

Study area boundary

Mining district or mineralized area

Mine with recorded production

Prospect

MPM
Montana Prime Meridian

BM
Boise Meridian

Mines and prospects examined by the Bureau of Mines

1. Unnamed
2. Bear Paw
3. Tendoy
4. Harkness North
5. Harkness
6. Last Chance
7. Screen Creek
8. Park
9. Continental
10. Viola Gwen
11. Coons Canyon
12. Unnamed
13. Clark and Rossi
14. Climax
15. Viola
16. Clipper
17. Nicholia Fraction
18. Slagpile
19. Upper Eidelman
20. Eidelman Canyon
21. Unnamed
22. Irish Canyon
23. Scott Trail
24. First Discovery
25. Peacock
26. Mc Neary
27. Upper-Heart Canyon
28. Heart-Meyers Area
29. Heart Canyon West
30. Unnamed
31. Heart Canyon
32. Unnamed
33. Elkhorn Group

Commodities [1]
Ag = Silver
Pb = Lead
Th = Thorium
U = Uranium
V = Vanadium
Zn = Zinc

[1] Chemical symbols (i.e. Ag, Pb) with mine or prospect indicates potential for that commodity

FIGURE 1.– Mines and prospects of the Italian Peaks RARE II areas

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R 29 E (BM)

R 12 W (MPM)

113° 00′

R 11 W (MPM)

R 10 W (MPM)

T 16 S (MPM)

T 13 N (BM)

T 12 N (BM)

44° 25′

44° 20′

Dell 25 miles

Dell 22 mi

Bear Creek

Tendoy Creek

Willow Creek

Nicholia Creek

Deadman Creek

Divide Creek

Dubois 50 miles

Eidelman Canyon

Italian Canyon

MONTANA

IDAHO

I—1945
M—4945

Italian Peak △
10,990′

Scott Peak △
11,393′

BIRCH CREEK MINING DISTRICT

(Pb, Ag, Zn)

(Zn)

(Pb,Zn)

EXPLANATION

Study area boundary

Mining district or mineralized area

R 31 E (BM)

112° 45′

R 32 E (BM)

T
13
N
(BM)

Dubois 33 miles

44°25′

Creek

Fritz

Webber

Creek

(Zn) X25

McNeary

Creek

X26

T
12
N
(BM)

Dubois 30 miles

44°20′

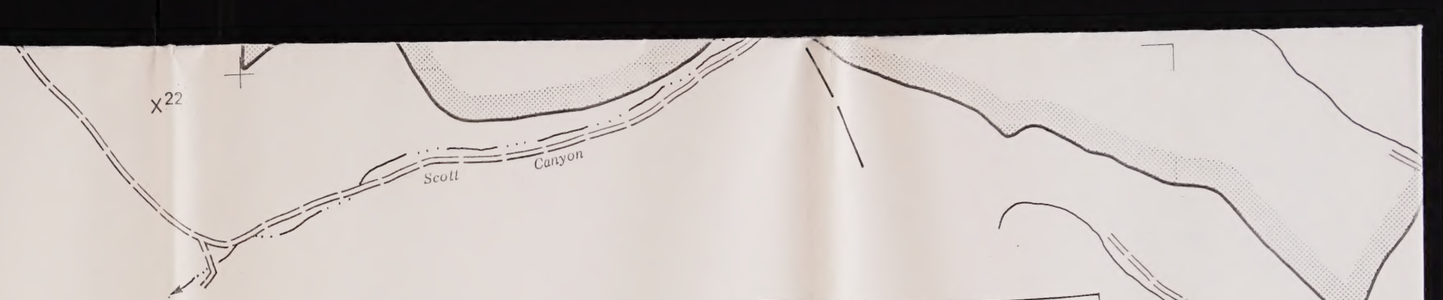
HEART MOUNTAIN
MINERALIZED AREA

⚒
Mine with recorded production

×
Prospect

MPM
Montana Prime Meridian

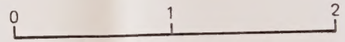
BM
Boise Meridian



Mines and prospects examined by the Bureau of Mines

1. Unnamed
2. Bear Paw
3. Tendoy
4. Harkness North
5. Harkness
6. Last Chance
7. Screen Creek
8. Park
9. Continental
10. Viola Gwen
11. Coons Canyon
12. Unnamed
13. Clark and Rossi
14. Climax
15. Viola
16. Clipper
17. Nicholia Fraction
18. Slagpile
19. Upper Eidelman
20. Eidelman Canyon
21. Unnamed
22. Irish Canyon
23. Scott Trail
24. First Discovery
25. Peacock
26. Mc Neary
27. Upper-Heart Canyon
28. Heart-Meyers Area
29. Heart Canyon West
30. Unnamed
31. Heart Canyon
32. Unnamed
33. Elkhorn Group

Commodities [1]
Ag = Silver
Pb = Lead
Th = Thorium
U = Uranium
V = Vanadium
Zn = Zinc

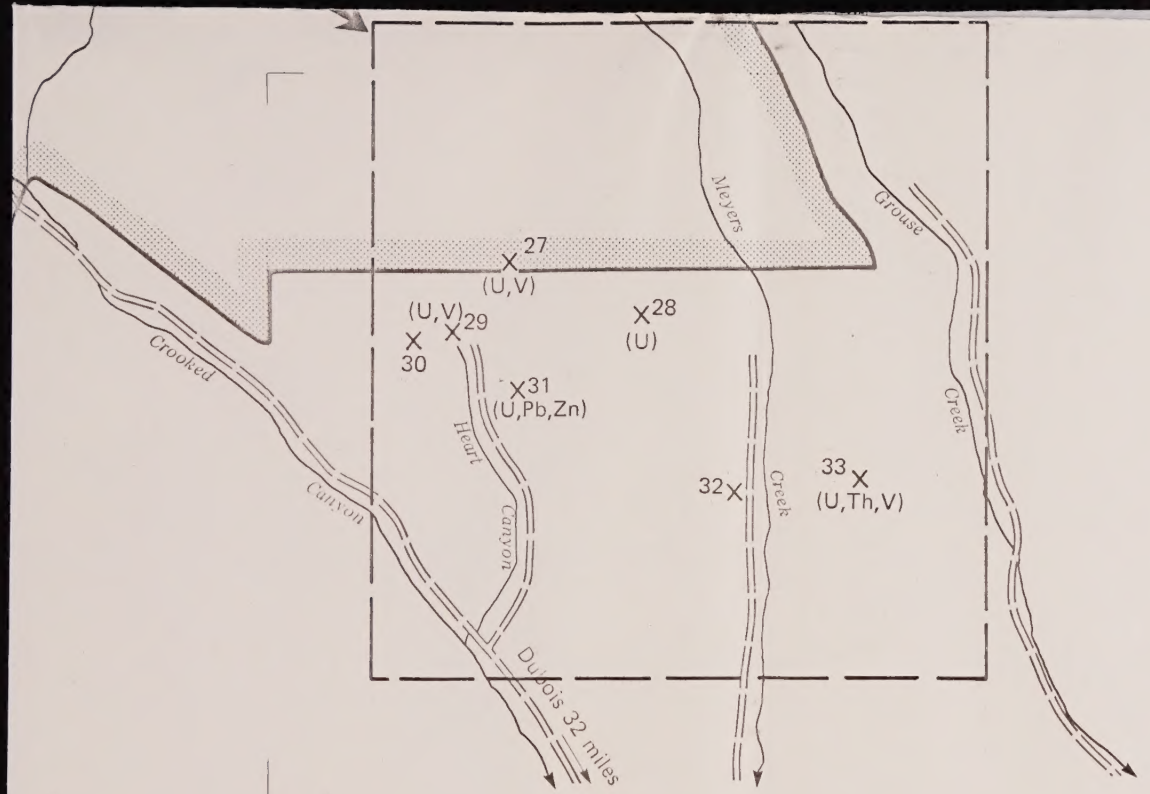


Victoria Canyon

R 31 E

[1] Chemical symbols (i.e. Ag, Pb) with mine or prospect indicates potential for that commodity

FIGURE 1.– Mines and prospects of the Italian Peaks RARE II areas



T
11
N
(BM)

(BM)

112°45

R 32 E (BM)

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In the study area, the Continental, Viola Gwen, First Discovery, and Peacock Prospects (fig. 1, nos. 9, 10, 24, and 25) have low potential for zinc or lead resources, and the Upper Heart Canyon Prospect (fig. 1, no. 27) has low potential for uranium-vanadium resources. The Heart-Meyers area, Heart Canyon West, and Heart Canyon Prospects (fig. 1, nos. 28, 29, and 31) are near but outside the area and have low potential for uranium, vanadium, lead, or zinc resources. There are 24 other prospects in or near the Italian Peak study areas. All are illustrated on figure 1.

There are approximately 250 current claims in the northern Birch Creek district and the Heart Mountain mineralized area; approximately ten are within the study area.

INTRODUCTION

Geographic Setting

The Italian Peak RARE II areas occupy part of the southern Beaverhead Range in Idaho and Montana. The study area is approximately 70 mi (113 km) northwest of Idaho Falls, Idaho. The Beaverhead National Forest portion, Beaverhead County, Montana contains 12,996 net acres (5,259 ha) of the study area; the Targhee National Forest portion, Clark and Lemhi Counties, Idaho contains 42,500 net acres (17,200 ha). The highest point is 11,383 ft (3,470 m) at Scott Peak; maximum relief is approximately 4,400 ft (1,300 m). The area has moderate summers and severe winters. The extremely rugged interior hosts only shrub brush, but the lower valleys contain evergreen timber stands. Average annual rainfall is less than 10 in (25 cm). No roads penetrate the interior, but the border is accessible by gravel roads in most stream drainages.

Present and Previous Studies

U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) Further Planning areas are being studied by the U.S. Bureau of Mines and U.S. Geological Survey. The responsibility of the Bureau is to determine the grade, tonnage, and mineral relationships of specific deposits and the probability for extensions of these deposits. The Geological Survey maps the geology and conducts geochemical and regional geophysical studies to estimate the potential for mineral deposits.

This evaluation was conducted by personnel from the Western Field Operations Center, Spokane, Washington during 1980.

Shenon (1928), Anderson and Wagner (1944), Scholten and Ramspott (1968), Skipp and others (1979), and Wodzicki and Krason (1981) made earlier studies in the general area. During the early 1900's several mine inspectors of the Idaho Bureau of Mines and Geology compiled historical information and production data concerning the Birch Creek mining district.

Mining Activity

The northwest corner of the study area includes the north part of the Birch Creek mining district, a significant lead-silver district in Idaho. The district extends from Willow Creek (fig. 1) for 25 mi (40 km) to the south-southeast. Total production was $2.5 million to $5.0 million in lead, silver, and zinc, dominantly from the Viola Mine (fig. 1, no. 15) and a few adjacent mines (Anderson and Wagner, 1944, p. 14). Only sporadic small shipments and minor prospecting has occurred since 1890. The Heart Mountain mineralized area near the south border of the study area was prospected during the "uranium boom" of the 1950's, but no development occurred. An exploratory drilling program was conducted in 1977 to search for uranium deposits.

The Idaho portion of the study area, RARE II area No. M-4945, contains several mineral prospects, but none were found in the Montana portion, RARE II area No. I-1945.

MINES, PROSPECTS, AND MINERALIZED AREAS

Setting

Lead, silver, and zinc minerals were first discovered in the Birch Creek mining district at the Viola Mine west of the study area (fig. 1, no. 15) in 1881, and by 1890 all the major mines and prospects in the district had been located (Anderson and Wagner, 1944, p. 14). Production began in 1882, and in 1885 a smelter was in operation near the Viola Mine; operations were suspended in 1890. Since then, production has been limited to sporadic shipments of copper ore from the Scott Mine [15 mi (24 km) south of the area] between 1910 and 1925 (Anderson and Wagner, 1944, p. 25) and lead-silver-zinc ore from various mines during the 1920's (Shenon, 1928, p. 20 and 21). All production was from outside the RARE II areas. There was minor prospecting during World War II (Anderson and Wagner, 1944, p. 14). Field evidence indicates an adit was driven during the mid-1960's at the Eidelman Canyon Prospect (fig. 1, no. 20). A drilling program was conducted in the vicinity of the Viola Mine during 1977 (E. J. Wilson, owner, personal communication, 1980). The probable site of an old placer mine (fig. 1, no. 7) was found in Willow Creek, but there is no recorded placer gold production and Bureau of Mines placer samples contained no gold.

No production has occurred from the Heart Mountain mineralized area at the south end of the study area. Most prospecting occurred during the post-World War II "uranium boom", but an exploratory drilling program was conducted at the Elkhorn Group (fig. 1, no. 33) during 1977.

Base and precious metals occurrences - dominantly in the Birch Creek district - appear to be basin-margin, carbonate-hosted type within the Jefferson Formation of Devonian age; however, some investigators consider them to be of magmatic hydrothermal origin. The uranium-vanadium deposits are dominantly in the Heart Mountain area and appear to be black-shale-hosted deposits in the Mississippian-Devonian McGowan Creek Formation or possibly the underlying Devonian Three Forks Formation. In some deposits the minerals may have been mobilized and concentrated in shear zones during orogenies. Both carbonate-hosted and shale-hosted deposits occur in the Birch Creek district and the Heart Mountain mineralized area; however, the former variety is most common in the Birch Creek district while the later type is most common in the Heart Mountain area.

The total number of claims located in or near the study area could not be determined; however, there are approximately 250 active claims, of which about ten are within the area. About half of the 250 active claims are in the Heart Mountain area, and half are in the Birch Creek district. One patented claim of 16.25 acres (6.596 ha) encompasses the Viola Mine.

No mineral occurrences were sufficiently exposed to determine tonnage and grade.

Birch Creek Mining District

The north end of the Birch Creek mining district, including the northwest portion of the study area, is readily accessible by gravel roads (fig. 1). The topography of the district is not exceptionally rugged, and there are no major obstacles to construction of improved roads.

The ore bodies in the district have been described as oxidized replacement deposits of lead, silver, zinc, and copper derived from magmatic hydrothermal fluids which migrated from depth along the range front fault system (Shenon, 1928; Anderson and Wagner, 1944). However, a possible classification as basin-margin, carbonate-hosted deposits can be inferred based upon: 1) the paleogeography of the Jefferson Formation dolomitic limestone host-rock (Poole, Sandberg, and Boucot, 1977); 2) the descriptions of the ore bodies by Anderson and Wagner (1944); none of the faults host vertically continuous vein systems or obvious hydrothermal alteration; 4) the only granitic rock which crops out nearby, the Beaverhead Granite to the north, is older than the host rock of the ore deposits; and 5) no mineral deposits are known to be associated with the Tertiary dikes.

All major underground workings in the northern part of the district - most of which are outside the RARE II study area - were inaccessible, and the mineral-host rock relationships could not be examined during the field studies.

Throughout the district the common ore minerals are argentiferous secondary oxides, carbonates, and silicates of lead, zinc, and copper. Common gangue minerals are barite, limonite, manganese oxides, jasper, gypsum, siderite, hematite, and quartz. Sporadic remnants of primary sulfide minerals include galena, sphalerite, chalcopyrite, pyrite, and tetrahedrite (Anderson and Wagner, 1944, p. 16).

There is potential for additional lead-silver-zinc deposits in the vicinity of the Viola Mine - based on the high density of minor occurrences, the favorable geology, and past production records.

Heart Mountain Mineralized Area

The Heart Mountain mineralized area includes the southeast corner of the Italian Peak Middle RARE II area and is readily accessible by gravel roads (fig. 1). The topography, except in the extreme north end, is not rugged; there are no major obstacles to road construction.

The uranium-vanadium deposits are classified by Wodzicki and Krason (1981) as stratiform and black shale-hosted. The host is the Mississippian-Devonian age McGowan Creek Formation although some uranium may be within the underlying Three Forks Formation (Betty Skipp, personal communication, 1982). Most of the occurrences are outside the study area. Deposits are not well exposed, because the McGowan Creek Formation is easily eroded and accessible workings are scarce.

One uranium-vanadium occurrence outside the study area appears to have moderate potential for resources; it is at the Elkhorn Group (fig. 1, no. 33) owned by Silco Mining Company of Phoenix, Arizona. The McGowan Creek Formation is exposed in four 100-ft (30-m)-long trenches. Eighteen test holes with a combined length of 4,882 ft (1,488 m) were drilled on this property, and most of them encountered some uranium minerals. One hole contained a 23 ft (7 m) intercept with a grade of 0.10 percent equivalent uranium oxide (eU_3O_8) as estimated from the gamma ray log by U.S. Department of Energy methods. Mr. Henry Childs (Silco Mining Company, written communication, 1981) indicated that the disequilibrium factor (U_3O_8/eU_3O_8) is 1.45 1/, and the true grade of this intercept is thus approximately 0.15 percent uranium oxide (U_3O_8). The minerals were not at the present location long enough to be in equilibrium with daughter products. A Bureau of Mines surface sample at this prospect contained 0.59 percent vanadium oxide (V_2O_5).

MISCELLANEOUS PROSPECTS

There are other prospects throughout the Italian Peak RARE II areas; nearly all are in the Jefferson and McGowan Creek Formations. A few prospects in the extreme northwest corner of the area have been excavated in syenite phases of the Beaverhead pluton, which often have weakly anomalous background radioactivity. Sporadic lenses of subeconomic phosphatic shale occur in the Paleozoic rocks, but none constitute a resource.

1/ Percent eU_3O_8 is equivalent percent uranium oxide, assuming the radioactivity is proportional to uranium content. Where uranium minerals have migrated, it takes several thousand years for uranium and radioactive daughter products to attain equilibrium. Before equilibrium is reached, eU_3O_8 is less than true U_3O_8 content, and the disequilibrium ratio is greater than 1.0.

Table 1 describes prospects in the study area as well as adjacent parts of the Birch Creek mining district and Heart Mountain mineralized area. No prospects were found in the Montana portion (RARE II area I-1945) of the study area. Some of the prospects shown on figure 1 have caved workings which were not examined during the field study; information was taken from Shenon (1928), Anderson and Wagner (1944), and Mitchell and others (1981). There were also 67 minor prospect pits east of the Viola Mine that were examined but not illustrated on figure 1. Almost all are in barren colluvium; only two were dug to bedrock. A grab sample of float in one pit contained 6.6 percent P_2O_5 and a trace of silver.

Table 1.--Mines and prospects of the Italian Peak RARE II areas

[underlined names refer to properties inside the study area]

Map no. (fig. 1)	Name	Summary	Workings	Sample data
1	Unnamed	The workings are in colluvium with large sub-rounded cobbles of brecciated quartzite recemented with silica. There has been no apparent mineralization.	A small pit and a short trench	None.
2	Bear Paw	The claim was located in 1957-probably for uranium -in the Jefferson or McGowan Creek Formation which has a local strike of N. 45° E. and a dip of 55° NW.	A 120-ft (37-m)-long and 7-ft (2-m)-deep trench	One sample; no economically significant minerals. No anomalous radioactivity.
3	Tendoy	Workings are in highly altered and iron-stained Precambrian quartzite.	A 30-ft (9-m)-long, 6-ft (2-m)-deep trench and probable 100-ft (30-m)-long, caved, inclined shaft	Four samples; no economically significant mineral concentrations.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
4	Harkness North	The prospect is dominantly in syenite float of the Beaverhead pluton, but a northern trench is in limestone. The contact is obscured, but it may be an approximate east-west-trending thrust fault. The syenite exhibits epidotization and abundant manganese staining. The limestone contains limonitic shale layers and black chert. Some float is syenite breccia cemented by hematite, and some is volcanic rock.	A 1,200-ft (370-m) trench, a 300-ft (90-m) trench, and two 100-ft (30-m) trenches in syenite talus. A 300-ft (90-m) trench and a 100-ft (30-m) trench are in syenite bedrock, and a 100-ft (30 m) trench at the north end of the prospect is in limestone.	One chip sample of syenite and one select sample of syenite float contained 45 and 38 parts per million (ppm) U_3O_8. Another sample of syenite float and one chip sample of limestone contained no significant mineral values.
5	Harkness	A west-northwest-striking, 38° SE.-dipping shear zone which exhibits weakly anomalous radioactivity. Country rock is epidotized syenite with manganese stain. Tertiary basalt and dacite (?) feeder dikes occur in the prospect.	A 200-ft (60-m) trench in the shear zone, a 100-ft (30-m) trench and small pit in syenite.	One 8-ft (2-m) chip sample in the shear zone contained 13 ppm U_3O_8. Two grab samples of syenite were barren.
6	Last Chance	An east-trending major thrust fault in epidotized syenite of of the Beaverhead pluton. There is abundant manganese and iron staining.	A 200-ft (60-m) trench, a 100-ft (30-m) trench, and two pits, all in syenite.	Five chip samples and one grab sample; no economically significant minerals

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
7	Screen Creek	A screen and remains of a possible gold rocker were found on a small tributary of Willow Creek, which drains Paleozoic sedimentary and igneous rocks.	An 8-ft (2-m)-long pit in barren limestone 1,200 ft (400 m) northeast of the rocker	Six alluvium samples were taken along the small tributary for 1 mi (2 km) to the northeast of screen. No gold was detected in pan concentrates.
8	Park	Interbedded layers of gossan and gossan-bearing gray shale from 6 in (15 cm) to greater than 6 ft (2 m) thick within gray cherty limestone. The layers strike north and dip 60° W. Gossan-bearing outcrops occur over an area 500 ft (150 m) by 500 ft (150 m). Dump at adit contains 25 tons (23 t) of slag, apparently from an old, crude smelter. Corner markers suggest ten or more claims in a group.	A northwest-trending caved adit probably 250 ft (76 m) long, three pits up to 6 ft (2 m) deep, an 11-ft (3-m) shaft, a bench 100 ft (30 m) long and 20 to 60 ft (6 to 20 m) wide, a 150-ft (46-m) trench up to 15 ft (5 m) deep, a shallow 55-ft (17-m) trench, 1,000 ft (300 m) of road, and three abandoned cabins	Two chip, six grab, and four alluvium samples: two chip samples of gossan-bearing shale each contained 0.4 oz silver per ton (14 g per t); one grab sample of gossan contained 0.46 percent zinc; two alluvium samples from gulleys on the south side of Willow Creek contained minor traces of chrysocolla as did two others taken 450 ft (140 m) upstream and 300 ft (30 m) downstream from the prospect. The remaining samples contained no economically significant minerals.
9	Continental	Weakly limonitic shale layer in dark-gray, sandy limestone	A small pit	One grab sample contained 0.54 percent zinc.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
10	Viola Gwen	A zone of gossan-bearing, shaley limestone and red-brown jasper layers exposed downdip for 300 ft (91 m) on the 30° SW. dipping limb of a northwest trending anticline. Country rock is gray, sandy limestone.	A 10-ft- (3-m)-long, 3-ft- (1-m)-deep trench on the north end of the zone, and two 2-ft (0.6-m) deep pits on the south end	Eleven grab samples: one from the north trench contained 0.19 percent zinc; one from a pit contained 0.67 percent zinc.
11	Coons Canyon	Prospecting had been conducted in an easterly direction for 1,600 ft (500 m) at the head of Coon's Canyon. Country rock is gray, cherty limestone with sporadic oolitic layers.	Eleven prospect pits and two shafts about 6 ft (2 m) deep	Fourteen samples: no economically significant minerals.
12	Unnamed	Colluvium of gossan-bearing, sandy limestone and dolomite, abundant cherty dolomite, and some shale.	Twenty-one prospect pits, two 90-ft (30-m) trenches, and two drill holes	Twenty-three samples, including the drill cuttings: no economically significant minerals.
13	Clark and Rossi	Tabular, stratiform deposit of iron and manganese oxide in the Jefferson Formation which consists of sandy dolomite with shale interbeds. Two mineralized pods, separated by a fault, are up to 3 ft (1 m) thick and 60 ft (20 m) long. The dolomite strikes N. 15° E., and dips 37° SE.	A 220-ft (70-m) inclined shaft sunk downdip. The shaft contains a 43-ft (13-m) drift and a short raise. There is also a 40-ft (10-m) adit 150 ft (46 m) west of the shaft and parallel to it, a 10-ft (3-m) adit, and a shallow pit.	Twelve samples: a chip sample at the end of the shaft contained 0.45 percent zinc; a sample of the dump contained 0.33 percent zinc; the others contained no economically significant minerals.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
14	Climax	Possible northern extension of the Viola ore body containing some low-grade zinc (Bell, 1906, p. 93). Not examined during the RARE II study.	One shaft of unknown depth	None
15	Viola	According to Anderson and Wagner (1944), the ore bodies were 900 ft (300 m) long and up to 90 ft (30 m) thick, contained lenses of limestone waste, and were very irregular. The ore was friable lead carbonate with 5 to 15 oz silver per ton (200 to 500 g per t), and 20 to 60 percent lead. Anderson and Wagner (1944) indicate the ore bodies are stratiform and connected by nonconformable fissures. The limestone strikes N. 35° E., dips 20 to 40° SE. The lower pod reportedly terminates at a fault. Some mining was by open cut.	Total haulage workings are 2,500 ft (760 m) long. Extent of raises and stopes are not known	None
16	Clipper	According to Shenon (1928), the ore body consisted of a 20-ft (6-m) wide pod of red-brown to yellow-brown material in blue magnesian limestone.	A shaft and two adits of unknown length	The deposit was said to average 4 percent lead, but a sample by Shenon contained only low values of lead and zinc. Drill cuttings possibly from this pod were sampled during the RARE II study; they contained no significant metal values.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
17	Nicholia Fraction	Workings are along a limestone-quartzite fault contact (Shenon, 1928, p. 23).	A 124-ft (38 m), two-compartment shaft, a 130-ft (40 m) inclined shaft, and several drifts of unknown length	One select dump sample contained 0.2 oz silver per ton (7 g per t), 0.1 percent lead, and 0.3 percent zinc.
18	Nicholia Smelter (slag)	Two thousand tons (1800 t) of slag remain. Most of the original material was shipped to Salt Lake City during World War II (John Wilson, personal communication, 1980).	No remaining structures	Two random grab samples taken of slag contained traces of gold, tungsten, copper, and lead. One contained 4.6 percent zinc, the other contained 1.5 percent zinc.
19	Upper Eidelman	Gossan-bearing shear zone at least 10 ft (3 m) thick, with abundant manganese oxide minerals. The zone is possibly related to the Eidelman Canyon fault. It is vertical and exhibits a local strike of N. 58° E. The zone cuts gray, cherty limestone with interbeds of the Carboniferous undivided unit.	A caved adit with an estimated 150 ft (40 m) of workings. The adit probably intersects an approximately 90-ft (30-m)-deep, partially caved shaft 100 ft (30 m) to the east. There is a 90-ft (30-m)-long by 60-ft (20-m)-long by 15-ft (4.6-m)-deep trench 200 ft (60 m) east of the shaft.	Five dump samples: no economically significant minerals.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
20	Eidelman Canyon	Limonitic shale layers up to 1 ft (0.3 m) thick interbedded within gray-black dolomite with chert breccia. Strata strike northeast, dip 30° SE. A thrust fault and several shear zones filled with breccia and limonitic gouge up to 2.5 ft (0.76 m) thick cut bedding at angles of up to 30°. Several small, limonitic, gouge-filled faults cut shear zones at higher angles. Shears and faults strike N 45° to N 55° E and dip 30° to 80° NE and NW. The rock unit is either McGowan Creek or Jefferson Formation.	Four adits with 622, 76, 18, and 15 ft (190, 23, 5.5, and 4.6 m) of workings. A 23-ft (7-m) shaft with caved incline at bottom; two dozer trenches, 90 and 165 ft (30 and 50 m) long; two dozed benches of 0.4 acres (0.2 ha) and 0.1 acres (0.04 ha).	Twenty-seven samples from the main workings: one chip sample of limonitic shale layers in an adit contained 0.4 oz silver per ton (14 g per t), 0.14 percent lead, and 126 ppm U_3O_8. The two highest grade surface samples at the main working contained 0.8 and 0.5 percent zinc.
		Southeast of the main workings are many other exploratory pits and adits - mostly in colluvium. Claim location notices had mid-1920's dates. Rock is limestone and shale. The few exposures strike northeast and a dip of 45° SE. The easternmost pit contains oolitic phosphate rock.	Seventeen sloughed pits and two short, caved adits. Only one pit excavated to bedrock.	A grab sample from a pit contained 6.3 percent phosphorous pentoxide (P_2O_5). Twenty other grab and select samples contained no economically significant minerals.
21	Unnamed	Workings are in colluvium of gray, shaley limestone in the McGowan Creek or Jefferson Formation.	One churn drill hole of unknown depth and a timbered, caved shaft of unknown depth	Two samples: no economically significant minerals

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
22	Irish Canyon	Fractured, shaley limestone cemented by calcite with abundant manganese and iron oxides and minor chert. Rock is a Carboniferous unit striking N. 15° E., dipping 33° W.	An 8-ft (2-m) adit	Two samples: no economically significant minerals
23	Scott Trail	Workings are in a Carboniferous unit of limonitic shale and sandy limestone striking N. 50° W., dipping 55° NE. The claims were first located in 1927, then relocated in 1957. They are several hundred feet north of the canyon bottom.	A 70-ft (20-m) trench, a short caved adit, and a prospect pit	Nine samples: no economically significant minerals
24	First Discovery	Traces of malachite and azurite on limonitic shale layers in sandy dolomite or limestone of the lower McGowan Creek or Jefferson Formation. Slump features and intraformational conglomerate are common. The beds strike northwest and dip 12° SW. The adits are in an east striking, vertical, 4-ft (1-m)-thick vein of massive calcite and travertine. The calcite is transected by a limonitic, northeast-striking, near vertical, 6-ft (2-m) shear zone.	A 150-ft (46-m) adit, a probable 40-ft (10-m)-long caved adit, one 20-ft (6-m) trench in limestone, a small pit in quartzite to the west	Nine chip and three select samples: One chip sample contained 0.17 percent copper and a select sample contained 0.15 percent copper. Two chip samples contained 2.0 percent lead and 0.6 percent zinc, and 0.9 percent lead and 0.4 percent zinc, respectively. The other samples contained no economically significant minerals.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
25	Peacock	Interbedded limonitic shale and sandy dolomite. The shaft is in a gossan pod. All workings are in the Jefferson Formation or the lowermost part of the McGowan Creek Formation. Strike is northwest; dip is northeast and variable.	A 7-ft (2-m) shaft in bedrock, five 20 to 50-ft (6 to 15-m) trenches in colluvium, and three pits in colluvium	Ten samples: a grab sample in the shaft contained 0.4 percent zinc. The other samples contained no economically significant minerals.
26	McNeary	The short adit is near the Precambrian rock -Jefferson Formation contact in iron-stained quartzite. The longer adit is in Precambrian rock.	A 10-ft (3 m) caved adit and a 50-ft (15-m) caved adit	Two samples: no economically significant minerals
27	Upper Heart Canyon	Exploratory pits in McGowan Creek Formation cherty, sandy limestone and interbedded limonitic gray shale with shrinkage cracks	Seven shallow pits, a 15-ft (4.6-m)-long shallow trench, and a 20-ft (6-m) adit	Six samples: three grab samples of limonitic shale colluvium in the western pits contained up to 155 ppm U_3O_8, 5.4 percent P_2O_5, and 1.1 percent V_2O_5. The other samples contained no economically significant minerals.
28	Heart-Meyers area	Trenches on a plateau overlying a fault zone in McGowan Creek Formation and Precambrian rock. Most trenches are in gravel. One is in shattered, coarse, limonitic sandstone.	Ten trenches - the largest of which is 50 ft (15-m) long and 10 ft (3 m) deep	Nine samples: one select sample in a coarse limonitic sandstone contained 190 ppm U_3O_8. The other samples contained no economically significant minerals.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
29	Heart Canyon West	Exploration trenches in interbedded, gray, limonitic shale and sandy limestone of the McGowan Creek Formation containing a highly limonitic channel sandstone.	Three trenches up to 100 ft (30 m) long, and one 6-ft (2-m)-deep pit	Four random samples: one in a sheared, limonitic sandstone contained 192 ppm U_3O_8, and 0.4 percent vanadium. Other samples were of shale and contained 84 to 155 ppm U_3O_8.
30	Unnamed	All workings are old and probably for lead-silver. They are excavated in interbedded limonitic, sandy shale and gray limestone of the McGowan Creek Formation. The strata strike northwest and dip moderately northeast. Limonitic and manganiferous layers are up to 5 ft thick in dark shaley strata.	One 40-ft (10-m) adit, a 50-ft (15-m) adit, a short caved adit, a possible 150-ft (46-m) caved adit, and two pits	Nine samples: a select sample contained 96 ppm U_3O_8, 1 percent lead, 0.3 oz silver per ton (10 g per t), and 0.4 percent copper. The other samples contained no economically significant minerals.

Table 1.--Mines and prospects of the Italian Peak RARE II areas--Continued

Map no. (fig. 1)	Name	Summary	Workings	Sample data
31	Heart Canyon	All workings are near a fault contact of Carboniferous sediments with McGowan Creek Formation or Precambrian rocks. All rock in the adit is buff weathering, shaley sandstone and shale. Strike of the McGowan Creek Formation is northeast and dip is 10° to 20° SE. The rock is cut by vertical east striking shears. The trenches are in a fault zone. The uranium minerals appear to be in a channel sandstone in shale.	Three 100-ft (30-m)-long, 10-ft (3-m)-deep trenches and a north-bearing 150-ft (46-m) adit with an 80-ft (25-m) drift	Three grab samples of sandstone in the pits contained 24 to 230 ppm U_3O_8. Four chip samples of the shear zones in the adit contained up to 33 ppm U_3O_8, 1 percent lead, and 0.5 percent zinc.
32	Unnamed	A west trench is in gray-buff Precambrian quartzite cut by iron-stained fractures. There are iron-stained pods in the quartzite. The east trench is in terrace gravel.	A 100-ft (30-m) trench on the west and a 50-ft (20-m) trench on the east	One sample: no economically significant minerals
33	Elkhorn Group	Uranium minerals are concentrated in fine lenticular sandstone layers in the McGowan Creek Formation (?) and in shear zones which transect the formation. Mineralized intercepts were continuous between most drillholes.	Four 100-ft (30-m)-long trenches, 18 drill holes with total footage of 4,882 ft (1,488 m), and 2,700 ft (820 m) of road	A chip sample of gossan in a north-south trending shear zone contained 120 ppm U_3O_8, 0.013 percent thorium, and 0.59 percent V_2O_5. Two grab samples from trenches contained slightly less. The best drill intercept was 23 ft (7.0 m) with a grade of 0.10 percent eU_3O_8.

ASSESSMENT OF MINERAL DEPOSITS

A few prospects examined in the study area have potential for mineral resources. Low potential for zinc-lead resources occur at the Continental, Viola Gwen, First Discovery, and Peacock Prospects (fig. 1, nos. 9, 10, 24, and 25), based on lead and zinc values in samples. Low but anomalous uranium and vanadium content in samples suggests low potential for uranium-vanadium resources at the Upper Heart Canyon Prospect (fig. 1, no. 27).

The Viola Mine (fig. 1, no. 15), west of the study area, has moderate potential for additional lead-silver-zinc resources, based on its production history. Moderate potential for uranium-thorium-vanadium resources is present at the Elkhorn Prospect (fig. 1, no. 33), southeast of the study area. Samples from the Heart Meyers area, Heart Canyon West, and Heart Canyon Prospects (fig. 1, nos. 28, 29, and 31) also indicate low potential for uranium and possibly vanadium, lead, and zinc resources.

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